



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 1 026 892 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.08.2000 Bulletin 2000/32

(51) Int. Cl.⁷: H04N 5/775, H04N 5/40

(21) Application number: 00100884.6

(22) Date of filing: 18.01.2000

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 03.02.1999 GB 9902287

(71) Applicant:
Pace Micro Technology PLC
Saltaire, Shipley, BD14 3LF (GB)

(72) Inventor: Coe, Peter
Skipton, North Yorkshire, BD23 2TE (GB)

(74) Representative: Wood, Graham
Bailey Walsh & Co,
5 York Place
Leeds LS1 2SD (GB)

(54) Vacant broadcast channel searching system

(57) The invention relates to the installation of electrical apparatus for receiving broadcast data, referred to as a receiver, which receives data and generates video/audio displays through a television set to which it is connected. When installing, the receiver can use the RF modulator signal from the television as reference but this can be interfered if the channel used to carry the signal is already used to receive a signal from an aerial input. The current invention prevents interference by first scanning the aerial input to identify the signals received and the location of the same which then allows free locations or channels to be identified and used for the RF modulator signal.

Description

[0001] The invention to which this application relates is an improvement in the selection of a convenient TV modulator channel upon installation of a receiver for broadcast digital data, referred to as a receiver, which is used for receiving broadcast digital data signals in conjunction with a display means such as that of a television set and particularly when there is a need to access and read the control menu for the receiver which is achieved by using the RF modulator output, at the time of installation of the receiver.

[0002] At the present time, the use of RF modulator output to read the control menu of the receiver requires the person who is installing the receiver to first tune the display means, hereinafter referred to as a television set, connected to the receiver into the RF modulator output of the receiver, using the channel for the output, typically the default channel setting. If a customer has connected the aerial lead to the television set at this time then there may potentially be interference between the default channel and the signal entering via the aerial lead as all signals present at the aerial lead are fed through to and added with the TV modulator output. At the present time, the solution is to use a channel not present at the aerial input so as to avoid the occurrence of interference but there is currently no means by which to identify the signals which are present at the aerial input so that it is not then possible to know which channel to select. It is also possible that more than one channel will be needed, as TV signals generated by other TV appliances, such as Video Cassette recorders, other receivers, games machines and the like, may be placed after the TV modulator output and before the TV, these other TV appliances therefore perhaps using or needing a free channel also.

[0003] The aim of the present invention is to allow a means whereby the installer of a receiver which uses the RF modulator can identify a default channel or channels which can be selected and to allow the installer to be sure that no interference will occur.

[0004] In a first aspect of the invention there is provided apparatus comprising a receiver for receiving broadcast data signals in conjunction with a television set and installation means, said apparatus utilising an RF modulator and in installing the apparatus the installer tunes the television set into the RF modulator output and characterised in that the installing means frequency scans the entire aerial input to the apparatus to identify the frequency locations of all of the station signals and/or other types of signals which are received by the receiver and allocated digital and analogue channels, and available or free frequency locations are then identified for the selection of the location of the said modulation output from the television set on one of said available frequency locations for the subsequent installation procedure to then be followed.

[0005] In one embodiment the other types of sig-

nals received can be any or any combination of Taxi radio signals, radar and other signals external to the television but which may be received and the location of which can usefully be identified.

5 [0006] Typically the frequency location of these signals at the aerial input are identified and stored in a memory in the receiver, such as non-volatile memory, so that the receiver control system can then indicate the preferred default channel frequency for use of the RF modulator. Thus, for example, if one of the possible channels for the use of the RF modulator in the installation is channel 37, then this would be identified by the receiver as not being a preferred option due to the existence of a TV Station on the same channel 37 which would mean that there is a significant risk of interference if that channel was selected for the installation procedure. The receiver can instead identify that another channel, say channel 50 in the UK, for example, is free and sufficiently clear from any analogue channels or other signals so as to minimise the risk of interference to the RF modulator output signal.

10 [0007] This process requires the installer to retune the television set after the installation but this can be common practise during receiver installations in any case. The advantage to the installer is that they can be sure that the default channel which is chosen will be free of interference, during the installation procedure.

15 [0008] In a further aspect of the invention there is provided a method for installing a receiver of digital data with a television set utilising an RF modulator signal, said method comprising the steps of frequency scanning the input from an aerial for receiving the data, identifying and locating all of the signals received, storing said information in a memory, when the scanning is complete identifying those frequency and channel locations which are available and free, selecting one of said channels for the reception of the RF modulator signal to use in the installation of the apparatus.

20 [0009] A specific embodiment of the invention is now described wherein at the instant of switching on a television set with a broadcast data signal receiver to be installed, in accordance with the invention, the apparatus scans the broadcast data received at the aerial to identify all the channels, both digital and analogue and other types of signals, which can be received. The user can select the channels to be received for viewing, but in addition, details of all of the signals received are stored in a non-volatile memory in the receiver so that the position of the same is known.

25 [0010] With this information known, an RF modulator channel is generated which, for installation purposes, needs to be positioned at a free channel and preferably with a free channel adjacent thereto. The location of the free channels can be identified from the stored information on the known "used" channel locations. The RF modulator signal can then be positioned on an appropriate free channel by the installer or automatically by the receiver control system, which was not

previously possible.

[0011] In order to be able to identify the position of the modulator channel it is envisaged that a screen message is generated so that the position can be identified by scanning through the channels on the television to reach the message which indicates the position.

[0012] Thus, in one example, a sequence of actions in the following procedure can be followed in accordance with the invention.

1. The receiver is connected to a mains supply and the TV aerial lead is connected in the conventional manner
2. The receiver is powered on. The receiver identifies that it is at a new installation, having never before carried out a frequency scan or by checking for one or more known channels at the aerial input. Alternatively, the user (installer, customer or the like) may select a "new install" status using either the remote control hand set or front panel buttons, perhaps in conjunction with the receiver menu displayed on the television screen.
3. The receiver perhaps, but not necessarily, with the TV modulator turned off, scans the aerial input recording the frequency location and amplitude level if appropriate of all signals present at that input, and records the location of the signals.
4. The receiver then determines by software or the like the free or available frequency locations which are acceptably free of signals or having signals with amplitude levels which are determined as causing levels of interference which are acceptable and can be tolerated.
5. The TV modulator is then switched on and set to one of the free frequency locations. This location is also stored in memory.
6. The installer, customer or the like then tunes his TV set to the location of the TV modulator output in the usual way.
7. If in the event the frequency channel location channel chosen by the receiver for the TV modulator output is used by another TV appliance after the receiver then by means of the remote control handset or front panel and perhaps in conjunction with the menu, another frequency location, typically the next recorded location which is acceptably free of interference, can be selected, and the TV is again tuned to the TV modulator output signal in the normal way.

[0013] It will therefore be appreciated that the ability to select a free location for use of the RF modulator during the installation procedure by first identifying those locations which are already used, improves the efficiency of the installation procedure and the speed of same.

Claims

1. Apparatus comprising a receiver for receiving broadcast data signals in conjunction with a television set and installation means, said apparatus utilising an RF modulator and in installing the apparatus the installer tunes the television set into the RF modulator output and characterised in that the installing means frequency scans the entire aerial input to the apparatus to identify the frequency locations of all of the station signals and/or other types of signals which are received by the receiver and allocated digital and analogue channels, and available or free frequency locations are then identified for the selection of the location of the said modulation output from the television set on one of said available frequency locations for the subsequent installation procedure to then be followed.
2. A means according to claim 1 wherein all signals detected which are above a preset amplitude are detected and their position located by the installing means during the frequency scan procedure.
3. A means according to claim 1 wherein the frequency location of the signals which are detected at the aerial input are identified and stored in a memory in the receiver.
4. A means according to claim 3 wherein the memory used is a non-volatile memory and the receiver control system recommends a preferred channel frequency for the use of the RF modulator, based on the data held in the memory.
5. A means according to claim 1 wherein when the channel locations are detected and stored, an analysis of the same is undertaken to identify available channels and one of said channels selected as the location of a default channel for the RF modulator output signal.
6. A method for installing a receiver of digital data with a television set utilising an RF modulator signal, said method comprising the steps of frequency scanning the input from an aerial for receiving the data, identifying and locating all of the signals received, storing said information in a memory, when the scanning is complete identifying those frequency and channel locations which are available and free, selecting one of said channels for the reception of the RF modulator signal to use in the installation of the apparatus.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0884

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)						
Y	EP 0 881 830 A (MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD.) 2 December 1998 (1998-12-02) * the whole document *	1,3-6	H04N5/775 H04N5/40						
Y	PATENT ABSTRACTS OF JAPAN vol. 4, no. 36 (E-003), 26 March 1980 (1980-03-26) & JP 55 008181 A (SONY CORPORATION), 21 January 1980 (1980-01-21) * abstract *	1,3-6							
X	US 5 029 015 A (BAXTER T.) 2 July 1991 (1991-07-02) * the whole document *	1,2,6							
A	PATENT ABSTRACTS OF JAPAN vol. 10, no. 337 (E-454), 14 November 1987 (1987-11-14) & JP 61 141274 A (NEC IC MICROCOMPUT SYST LTD LTD), 28 June 1986 (1986-06-28) * abstract *	1-6							
A	EP 0 725 537 A (THOMSON CONSUMER ELECTRONICS INC.) 7 August 1996 (1996-08-07) * the whole document *	1-6	TECHNICAL FIELDS SEARCHED (Int.Cl.)						
A	PATENT ABSTRACTS OF JAPAN vol. 13, no. 429 (E-823), 25 September 1989 (1989-09-25) & JP 01 157680 A (TOSHIBA CORP.), 20 June 1989 (1989-06-20) * abstract *	1,6	H04N H03J						
		-/-							
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>20 March 2000</td> <td>Verschelden, J</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	20 March 2000	Verschelden, J
Place of search	Date of completion of the search	Examiner							
THE HAGUE	20 March 2000	Verschelden, J							
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document							
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document									



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0884

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
A	<p>PATENT ABSTRACTS OF JAPAN vol. 18, no. 488 (E-1605), 12 September 1994 (1994-09-12) & JP 06 165052 A (SANYO ELECTRIC CO LTD), 10 June 1994 (1994-06-10) * abstract *</p> <p>-----</p>	1,6							
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>20 March 2000</td> <td>Verschelden, J</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	20 March 2000	Verschelden, J
Place of search	Date of completion of the search	Examiner							
THE HAGUE	20 March 2000	Verschelden, J							

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 10 0884

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-03-2000

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 881830	A	02-12-1998	JP	10327361 A	08-12-1998
			CN	1200626 A	02-12-1998
JP 55008181	A	21-01-1980	JP	1297983 C	20-01-1986
			JP	60021486 B	28-05-1985
US 5029015	A	02-07-1991	AT	97286 T	15-11-1993
			DE	68910544 D	16-12-1993
			DE	68910544 T	11-05-1994
			EP	0325332 A	26-07-1989
			ES	2048820 T	01-04-1994
			GB	2214741 A	06-09-1989
			JP	1233885 A	19-09-1989
			JP	2966851 B	25-10-1999
			KR	142101 B	15-07-1998
JP 61141274	A	28-06-1986	NONE		
EP 725537	A	07-08-1996	US	5541671 A	30-07-1996
			BR	9600296 A	23-12-1997
			CN	1143295 A	19-02-1997
			JP	8251493 A	27-09-1996
			SG	65543 A	22-06-1999
			US	5748261 A	05-05-1998
JP 01157680	A	20-06-1989	NONE		
JP 06165052	A	10-06-1994	NONE		

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.